An approach to a pseudo real-time image processing engine for hyperspectral imaging

ABSTRACT

Hyperspectral imaging provides an alternative way of increasing the accuracy by adding another dimension: the wavelength. Recently, hyperspectral imaging is also finding its way into many more applications, ranging from medical imaging in endoscopy for cancer detection to quality control in the sorting of fruit and vegetables. But effective use of hyperspectral imaging requires an understanding of the nature and limitations of the data and of various strategies for processing and interpreting it. Also, the breakthrough of this technology is limited by its cost, speed and complicated image interpretation. We have therefore initiated work on designing real-time hyperspectral image processing to tackle these problems by using a combination of smart system design, and pseudo-real time image processing software. The main focus of this paper is the development of a camera-based hyperspectral imaging system for stationary remote sensing applications. The system consists of a high performance digital CCD camera, an intelligent processing unit, an imaging spectrograph, an optional focal plane scanner and a laptop computer equipped with a frame grabbing card. In addition, special software has been developed to synchronize between the frame grabber (video capture card), and the digital camera with different image processing techniques for both digital and hyperspectral data.

Keyword: Remote sensing; Image processing; Real-time; Frame grabber; Hyperspectral; Hardware/software design